

Oct. 30, 1951

B. E. BERLINGER

2,573,240

FISHING REEL

Filed July 30, 1947

2 SHEETS--SHEET 1

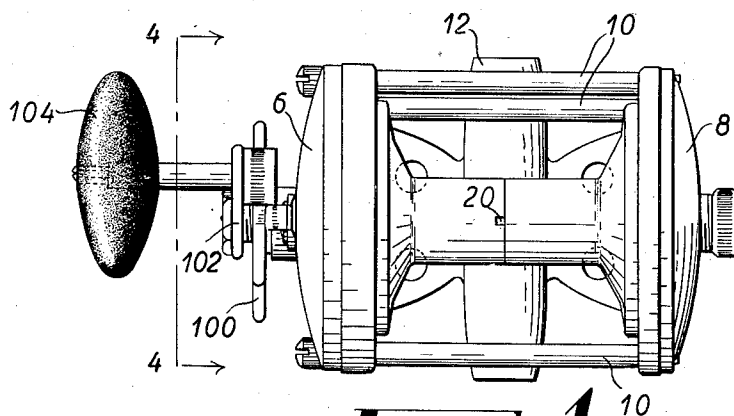


Fig. 1.

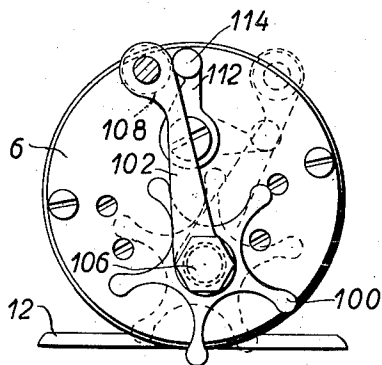


Fig. 4.

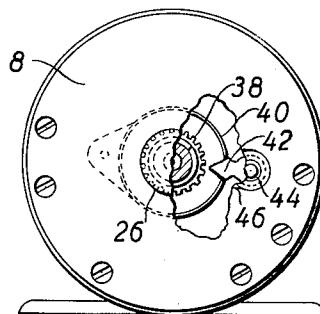


Fig. 3.

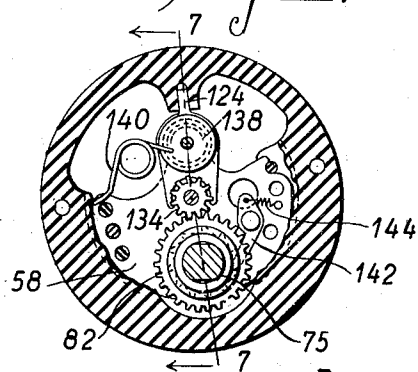


Fig. 5.

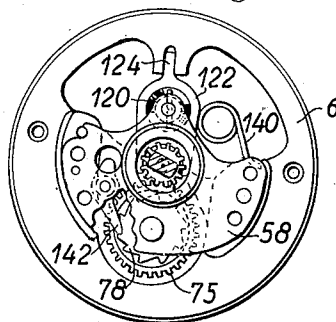


Fig. 6.

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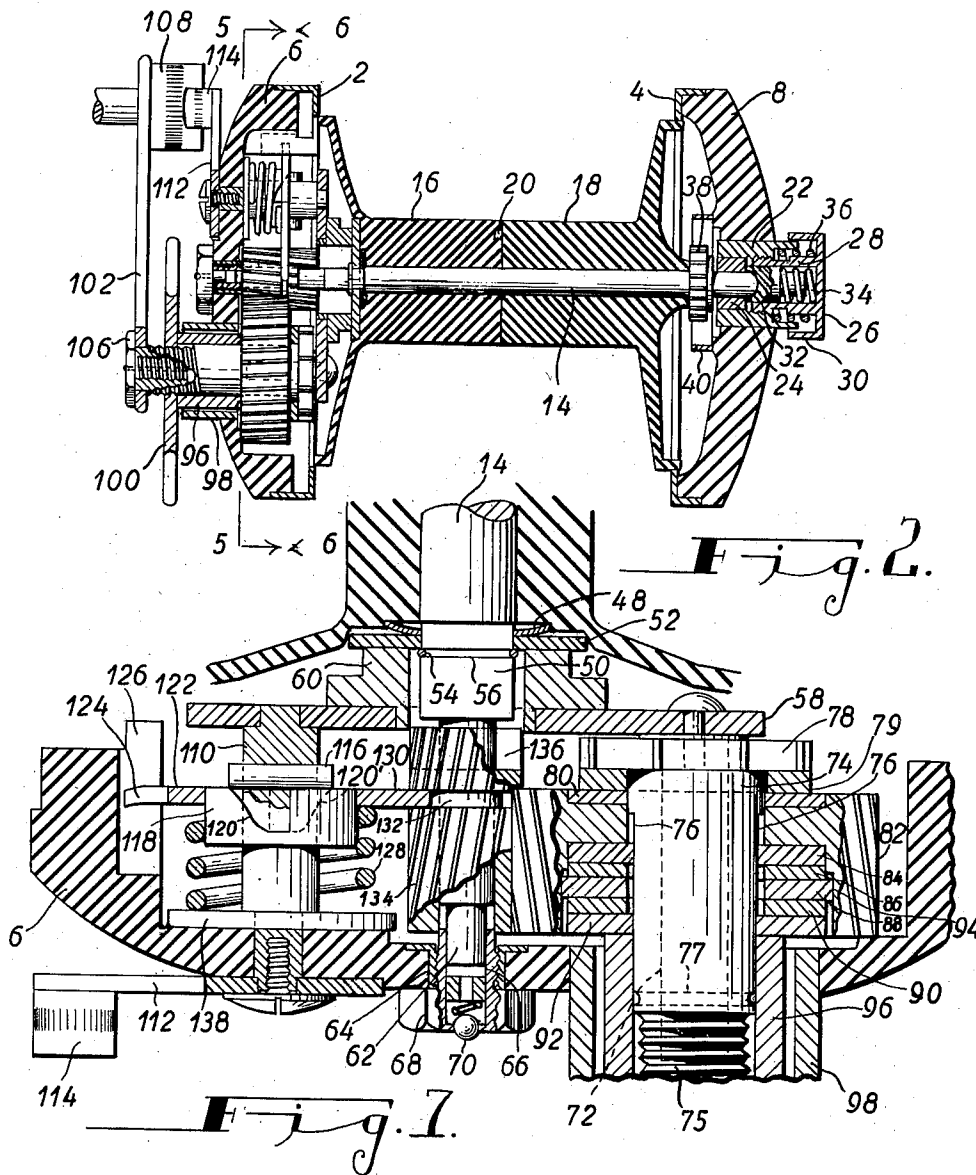
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FISHING REEL

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2 SHEETS—SHEET 2



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2,573,240

FISHING REEL

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4 Claims. (Cl. 242-84.1)

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This invention relates to fishing reels and has reference to various features for improving the construction and operation of such reels.

One of the objects of the present invention is the provision of means providing an automatic and adjustable snubbing action to afford proper control of the spool, particularly to prevent backlash. In this respect the present invention constitutes an improvement on the disclosure of my prior United States Patent No. 2,454,590.

A further object of the invention is to provide a thrust bearing for the spool to take care automatically of misalignment of the spool. The provision of a freely and smoothly running spool ordinarily requires the parts to be constructed to a degree of precision which becomes prohibitive in a device of this type not only because of cost of fabrication of the parts but because of difficulty of assembly if reasonable tolerance of clearances is not provided. In accordance with the present invention the requirements for high precision construction are substantially lessened since a simple thrust bearing is provided which takes care of misalignment of parts less precisely made and having reasonable clearances leading to slight assembly errors.

These and other objects of the invention particularly relating to details of construction will become apparent from the following description read in conjunction with the accompanying drawings in which:

Figure 1 is an elevation of a reel embodying the subjects of the invention;

Figure 2 is an axial section through the reel;

Figure 3 is an elevation of the right-hand end of the reel as viewed in Figure 1;

Figure 4 is a sectional view taken on the plane indicated at 4-4 in Figure 1;

Figure 5 is a transverse section taken on a plane indicated at 5-5 in Figure 2;

Figure 6 is an elevation, partly in section, showing the parts associated with the left-hand end of the reel viewed outwardly from the plane indicated at 6-6 in Figure 2; and

Figure 7 is an enlarged section taken on the plane indicated at 7-7 in Figure 5.

Metallic rings 2 and 4 support Bakelite end members 6 and 8 to provide a frame assembly held together by spacers and bolts indicated at 10 in Figure 1. The frame also comprises a sheet metal member providing the saddle 12 adapted to be secured to the rod.

A shaft 14 carries the spool which may be made in two sections 16 and 18 and provided with a passage 20 for securing the end of the

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line. The end member 8 has fixed therein a bushing 22 in which is mounted a bronze bearing 24 through which passes one end of the spool shaft 14. A screw member 26 has its shank 28 threaded into the bushing 22. A skirt 30 overlaps the end of the bushing and provides a housing for a spring 36 which serves frictionally to hold the screw 26 in adjusted position. A bore in the shank 28 of the screw receives a slidable thrust member 32 which is provided with a spherical depression for the reception of the spherical end of the shaft 14. A spring 34 presses the member 32 inwardly, the tension of this spring 34 being adjustable by rotation of the screw member.

The shaft 14 carries a pinion 38 with which cooperates a click 42 controlled by a spring 40 and mounted in a slot 46 by means of a pin 44 which may be moved by the fisherman's finger from the exterior of the reel. The arrangement is such that the enlarged shank of the click may move inwardly or outwardly by the ends of the spring 40 and the spring will yield laterally to permit the pinion to rotate with a clicking sound when the click is in its inner position.

Forced into one end of the reel is a ring 48 preferably of bronze which, as viewed in Figure 7, has a downwardly convex surface. This end of the shaft 14 is flattened as indicated at 50 and over it there is located a flat washer 52 which is preferably of stainless steel. A split ring 54 enters a groove 56 in the shaft to hold this washer assembled with the spool. The spool is provided with a clearance extending beyond the periphery of the washer 52 so that as will be evident from Figure 2 the washer has a limited but free possibility of rocking on the ring 48.

A plate 58 carried by the end member 6 supports a bronze bushing 60, the upper surface of which, as viewed in Figure 7, is smooth and flat so that the washer 52 may bear thereagainst. Relative rotation occurs between this bushing and the washer, the latter being provided with a rectangular opening fitting the flat end 56 of the shaft 14 so that the washer is constrained to rotate with the shaft. The washer and bushing are always in flatwise contact despite misalignment of the shaft 14 due to the fact that the convexity of the ring 48 permits relative angular movement between the spool and the washer 52. The end 62 of the shaft 14 is provided with a bearing in the form of a bore 66 in a screw 68 threaded into a bushing 64 carried by the end member 6. A spring pressed ball 70 normally closes an oiling

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opening in the screw 68. The bearing of the shaft end 62 is made relatively loose and serves primarily for approximate alignment of the spool in the frame. This bearing does not assume any of the thrust exerted by the spring 34, which thrust is taken by the contact between the washer 52 and the bushing 60.

A pin 72 riveted to the plate 58 provides a bearing for the hub 74 of a ratchet 78, lengthwise movement of the hub relative to the pin 72 being prevented by a pin 77 extending through the hub and engaging a groove in the pin 72. The hub 74 is flattened as indicated at 76 and is threaded at its outer end as indicated at 75.

On the hub 74 are assembled various elements including a metallic washer 79 and a fiber washer 80. Both of these are provided with circular openings so that they are free to rotate independently of the hub. The fiber washer 80 is seated in a hollow in a gear 82 which is also provided in its lower side as viewed in Figure 7 with a bore for the reception of a series of washers 84, 86, 88, 90 and 92. Washers 84, 88 and 92 are metallic. Washers 86 and 90 are of fiber. Washers 84 and 92 are provided with non-circular openings fitting the flattened portion of the hub 74 so that these washers are constrained to rotate with the hub. Fiber washers 86 and 90 are provided with circular openings so that they are free to rotate relative to the hub. The metallic washer 88 is also provided with a circular opening so that it is free to rotate with respect to the hub. However, it is provided with ears 94 engageable in slots in the walls of the bore in the gear 82 so that this washer must rotate with the gear.

A sleeve 96 surrounds the outer portion of the hub 74 and is arranged to be engaged by the nut 100 provided with arms easily grasped by the fingers. The nut 100 is threaded on the threads 75 of the hub and, as will be evident from the drawings, may be tightened so as to force tightly together and against the ratchet 78 all of the parts threaded on the hub 74. A clutching action is thus provided so that the hub 74 drives the gear 82 through the washers 84 and 92 rotating with the hub, the fiber washers 86 and 90 and the washer 94 which rotates with the gear.

An arm 102 carrying the handle 104 is secured to the end of the hub 74 by a screw 106. The arm 102 carries a projection 108 which is adapted to engage a projecting knob 114 extending from a lever 112 which is secured to a spindle 110 mounted in the end member 6 and the plate 58. A transverse pin 116 carried by the spindle cooperates with a cam member 118 provided with notches 120 and 120'. The cam member 118 carries a plate 122 having an ear 124 arranged to slide in a slot 126 in the end member 6. By reason of this arrangement rotation of the cam member 118 is prevented. A strong spring 128 urges the plate 122 and cam member 118 upwardly as viewed in Figure 7 against the pin 116.

A forked end 130 of the plate 122 engages a groove 132 formed in a pinion 134 which is slidable on the end of the shaft 14 and meshes with the gear 82. A transverse milled slot 136 in the pinion is arranged to receive the flattened portion 50 of the shaft 14 so that when the parts are in the position illustrated in Figure 7 the pinion 134 is disengaged from the shaft 14 and the latter may move freely with respect thereto but if the pinion is moved upwardly as viewed in Figure 7 it will be clutched to the shaft by the location of the flattened portion 50 of the shaft in the milled

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slot 136. The shift from one position to the other is effected by movement of the lever 114 and spindle 110 through approximately 90°. When the positions of these parts are as in Figure 7 the pin 116 lies above the top of the cam 118 holding the pinion out of clutching relationship with the shaft 14. If, however, the parts are moved to their alternative position the pin 116 by entry into the notches 120 and 120' permits movement of the cam member 118 upwardly with resulting shift of the pinion to clutched relationship with the shaft. In order to latch the spindle 110 yieldingly in its alternative position the spindle carries a disc 138 affixed thereto between which and the end member 6 there reacts a strong spring 140 (Figure 5), the line of action of which moves from one side to the other of dead center when the spindle is moved between its extreme positions.

A detent 142 controlled by a spring 144 acts upon the ratchet 78 previously described to prevent reverse rotation thereof.

As will be particularly clear from Figure 4, when the arm 112 is in declutching position its knob 114 will project in the path of the member 108 carried by the winding arm 102. Accordingly, whenever the winding arm is rotated the lever 112 will be tripped to the dotted line position illustrated in Figure 4, being moved to this extreme position by the action of the spring 140 and the camming action between the pin 116 and the sloping edges of the notches 120 and 120'. Accordingly, the fisherman may produce automatic clutching merely by starting a winding operation without the necessity for special manipulation of the knob 114. However, as will be obvious, the knob 114 is in convenient position to be easily flipped to either extreme position by the fingers.

The alternative operations of the reel will be apparent from the foregoing description of construction. The clutching of the shaft 14 to the pinion 134 has just been described. This clutching will not occur accidentally during a throw since the handle 104 is unbalanced and normally hangs downward with the result that centrifugal force will not cause its knob 108 to engage the lever 112 to clutch the pinion 134 to the spool shaft.

The clutching of the gear 82 to the hub 74 and to the winding arm 102 is effected through manipulation of the nut 100 which is so formed as to be readily moved to produce clutching or declutching by the fingers of the user, with whatever degree of friction may be desired. The pawl 142 prevents reverse rotation of the winding arm by the action of the line on the spool. The click 42 serves to signal rotation of the spool independently of any of the other portions of the mechanism.

In particular, there may be mentioned the action of the bearing members for the spool. As pointed out heretofore, the freedom of the plate 52 to rock with respect to the shaft 14 provides freedom of spool rotation without binding despite misalignment of the shaft with the bearings in the end members 6 and 8. Snubbing action is provided by the action of the member 32 on the spherical end of the shaft 14, some of this action being provided by friction between washer 52 and bearing 60. By adjustment of the screw 26 the compression of the spring 34 may be modified to secure whatever retarding action on the spool is desired. The interengaging spherical surfaces provide a smooth and proper snubbing action

automatically achieving the results which are usually secured by applying friction to the spool through thumbing, the desired frictional action being secured by adjustment of the compression of spring 34 by manipulation of screw 26.

It will be clear that variations may be made in the details of the construction described without departing from the invention as defined in the following claims.

What I claim and desire to protect by Letters Patent is:

1. A fishing reel comprising a frame, a spool having a shaft, and bearings supporting the shaft in the frame, one of said bearings including a bearing element carried by the frame and a second bearing element rotating with the shaft and having only the innermost portion of one radial face thereof in engagement with the shaft but having universal freedom of tilting movement with respect to the shaft, the bearing elements having radial plane faces engaging each other.

2. A fishing reel comprising a frame, a spool having a shaft, and bearings supporting the shaft in the frame, one of said bearings including a bearing element carried by the frame and a second bearing element rotating with the shaft and having only the innermost portion of one radial face thereof in engagement with the shaft but having universal freedom of tilting movement with respect to the shaft, the bearing elements having radial plane faces engaging each other through an annular region of contact.

3. A fishing reel comprising a frame, a spool having a shaft, and bearings supporting the shaft in the frame, one of said bearings including a bearing element carried by the frame, means providing a spherical surface carried by the shaft and a second bearing element rotating with the shaft but having universal freedom of tilting movement with respect to the shaft and bearing against said spherical surface, the bearing elements having radial plane faces engaging each other.

4. A fishing reel comprising a frame, a spool having a shaft, and bearings supporting the shaft in the frame, one of said bearings including a bearing element carried by the frame, means providing a spherical surface carried by the shaft and a second bearing element rotating with the shaft but having universal freedom of tilting movement with respect to the shaft and bearing against said spherical surface, the bearing elements having radial plane faces engaging each other, through an annular region of contact.

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